For this paper you must have:
• mathematical instruments
You must not use a calculator.

Instructions
• Use black ink or black ball-point pen. Draw diagrams in pencil.
• Fill in the boxes at the top of this page.
• Answer all questions.
• You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
• Do all rough work in this book. Cross through any work you do not want to be marked.

Information
• The marks for questions are shown in brackets.
• The maximum mark for this paper is 80.
• You may ask for graph paper, tracing paper and more answer paper. These must be tagged securely to this answer book.

Advice
In all calculations, show clearly how you work out your answer.
### Answer all questions in the spaces provided

<table>
<thead>
<tr>
<th></th>
<th>Work out</th>
<th>Circle your answer.</th>
<th>[1 mark]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$(-3) + (-8)$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-5$ $5$ $-11$ $11$</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>What does the longest bar in a bar chart represent?</td>
<td>Circle your answer.</td>
<td>[1 mark]</td>
</tr>
<tr>
<td></td>
<td>mean median mode range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Work out</td>
<td>$1.1 - 0.15$</td>
<td>Circle your answer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$0.95$ $1.05$ $0.85$ $1.085$</td>
<td></td>
</tr>
</tbody>
</table>
4. On a circle, which of these is **always** longer than the diameter?
Circle your answer.

- chord
- arc
- radius
- circumference

[1 mark]

5. Work out \( 83 \times 26 \)

[3 marks]

Answer _____________________________
6  The cost of 3 calendars is £18
Work out the cost of 5 calendars.  

[2 marks]

Answer  £______________________________

7  A helicopter blade does 3206 full turns in 7 minutes.
Work out the number of full turns per minute.  

[2 marks]

Answer  _________________________________
8 At a cinema, films are shown on Screen 1 and Screen 2
Customers pay full price or child price.

There are three times as many customers in Screen 2 as Screen 1
68 customers paid child price.

Complete the frequency tree.

[5 marks]
9 Work out the fraction that is halfway between $\frac{1}{2}$ and $1\frac{1}{4}$.

[3 marks]

Answer

10 $x$ is a positive integer.

$35 \div x$ is a positive integer.

Work out the four possible values of $x$.

[2 marks]

Answer _______ _______ _______ _______
11 A fair dice has six sides, numbered 1 to 6
After it is rolled, five of the numbers can be seen.

11 (a) Write down the probability that one of these five numbers is 2

[1 mark]

Answer

11 (b) Work out the greatest possible sum of the five numbers.

[2 marks]

Answer

Turn over for the next question
12 Work out \[ \frac{2}{7} + \frac{6}{7} \]
Circle your answer. [1 mark]

\[ \frac{1}{7} \quad \frac{8}{14} \quad \frac{8}{49} \quad \frac{5}{7} \]

13 Work out \[ 4 + 3 \times 5 - 1 \]
Circle your answer. [1 mark]

\[ 16 \quad 18 \quad 28 \quad 34 \]

14 The \( n \)th term of a sequence is \[ 5n - 2 \]
Work out the 3rd term.
Circle your answer. [1 mark]

\[ 51 \quad 5 \quad 123 \quad 13 \]
15 Trapezium $ABCE$ is made from parallelogram $ABCD$ and isosceles triangle $ADE$.  
$AE = DE$  
![Diagram of trapezium ABCE with triangle ADE]  
Work out the size of angle $AED$.  

[3 marks]

Answer ____________________________ degrees

16 $a : b = 1 : 6$  
$\frac{a}{c} = 3 : 1$  
How many times bigger is $b$ than $c$?  

[2 marks]

Answer ____________________________
17 (a) Laura wants to work out 3% of 1700
Her method is 1700 \times 0.3
Is her method correct?
Tick a box.

Yes  No

Give a reason for your answer.  [1 mark]

17 (b) Laura also wants to work out \( \frac{30}{29} \) of 60
Her answer is 58
Is her answer correct?
Tick a box.

Yes  No

Give a reason for your answer.  [1 mark]
Here are five shapes, A to E.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Parallelogram</td>
</tr>
<tr>
<td>B</td>
<td>Regular pentagon</td>
</tr>
<tr>
<td>C</td>
<td>Rhombus</td>
</tr>
<tr>
<td>D</td>
<td>Scalene triangle</td>
</tr>
<tr>
<td>E</td>
<td>Trapezium</td>
</tr>
</tbody>
</table>

In the Venn diagram,

- ξ is the set of all shapes
- Q is the set of quadrilaterals
- R is the set of shapes which always have rotational symmetry.

Complete the Venn diagram with the letters A to E.

[3 marks]
19 \( a = 7 \) and \( b = 2 \)

Work out the value of \( \frac{a}{b} - a^b \) \[3 \text{ marks}\]

Answer ___________________________________________________________________

20 Solve \( 3x - 8 = 19 \) \[2 \text{ marks}\]

\[ x = \] ___________________________________________________________________
21 Here are five number cards. 

17 12 23 15 16

Two of the five cards are picked at random.

Work out the probability that the total of the two numbers is **more than** 30

[3 marks]

Answer ________________________________
22 (a) Complete the table of values for \( y = x^2 \) \[1\text{ mark}\]

<table>
<thead>
<tr>
<th>( x )</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22 (b) Draw the graph of \( y = x^2 \) for values of \( x \) from -2 to 2 \[2\text{ marks}\]

22 (c) Use your graph to estimate the value of \( \sqrt{2.6} \) \[2\text{ marks}\]

Answer: ____________________________
23 Two consecutive whole numbers are \( n \) and \( n + 1 \)

23 (a) Simplify \( n - (n + 1) \)  

\[ n - (n + 1) = n - n - 1 = -1 \]

Answer

23 (b) Multiply out \( n(n + 1) \)  

\[ n(n + 1) = n^2 + n \]

Answer

23 (c) The two numbers are added. Show that the answer must be an odd number.  

\[ n + (n + 1) = n + n + 1 = 2n + 1 \]

The answer is an odd number.
24 Circle the value of \( \cos 30^\circ \) 

\[
\frac{1}{2} \quad \frac{\sqrt{3}}{2} \quad 0 \quad 1
\]

[1 mark]

25 Work out \( \frac{8}{2} + 2\frac{2}{3} \)

Give your answer as a mixed number.

[4 marks]

Answer ________________________________
26 A ship is sailing in a straight line from its home port. 
The distance-time graph shows 4 hours of the journey.

Work out the speed of the ship during these 4 hours.

[3 marks]

Answer _________________________ mph
Kim works at an airport in the UK. She records the number of planes landing between 10 am and 2 pm each day. The table shows the data for the first 10 days in January.

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of planes</td>
<td>148</td>
<td>151</td>
<td>147</td>
<td>155</td>
<td>153</td>
<td>147</td>
<td>155</td>
<td>102</td>
<td>151</td>
<td>154</td>
</tr>
</tbody>
</table>

27 (a) The airport was affected by fog on one of the days. Which day do you think it was? Give a reason for your answer. [1 mark]

<table>
<thead>
<tr>
<th>Day</th>
<th>__________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>____________________</td>
</tr>
</tbody>
</table>

27 (b) Kim uses the data to predict how many planes will land at the airport in a year. In her method, she uses an estimate of 150 planes in each 4-hour period throughout the day assumes the same number of planes each day. Work out her prediction. [3 marks]

Answer ____________________________________________________________________
27 (c) In fact,
   fewer planes land in winter than in summer
   fewer planes land at night than during the day.

What does this tell you about Kim’s prediction?
Tick **one** box.

- [ ] Her prediction is too low
- [ ] Her prediction is too high
- [ ] Her prediction could be too low or too high

Give a reason for your answer. [2 marks]

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Turn over for the next question
The sum of the angles in any quadrilateral is 360°
For example, in a rectangle 4 \times 90° = 360°

Zak writes,
5 \times 90° = 450° so the sum of the angles in any pentagon must be 450°

Is he correct?
Tick a box.

[ ] Yes  [ ] No

Show working to support your answer.  [2 marks]
29 \[ \sqrt{6^2 + 8^2} = 3\sqrt[3]{125a^3} \]

Work out the value of \(a\). 

[4 marks]

Answer

30 Work out the percentage increase from 80 to 280

[3 marks]

Answer

%
31 Solve \( x^2 - x - 12 = 0 \) [3 marks]

Answer

END OF QUESTIONS
There are no questions printed on this page